Cloud technologies
IDG 2001
Assignment 2

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1 Repository

Link to GitHub repo: https://github.com/asm492/cloud2

2 IoT scenario

Our group has chosen smart home as the IoT scenario. Our smart home consists of a thermometer which senses temperature and humidity. The thermometer is powered by batteries, so it reports the battery voltage to MQTT broker. Since the device is powered by batteries it is important to have a low-power protocol. We have chosen to go with Z-Wave as it is a proven and widley used protocol in smart homes[1]. The downside of using Z-wave compared to Zigbee is that it Z-wave has lower frequency which means that it can carry less data. However the low frequency means that the range is better and in our case we won't transfer much data. The range of the Z-wave means that the sensors will most likely have less issues with range in larger homes, or buildings with thick walls and floors.

The device will need a thermometer and a humidity sensor. We decided to use HDC2021 [2] from Texas Instruments because it measures both temperature and humidity, as well as being low-power.

3 Payloads

We have separated the different payloads (EXI, JSON and XML) into different files. As an example we have created two different subscribers for JSON and XML, one for **temperature and volt**, and one for **humidity and volt**. The same device (publisher) publishes on two different topics.

3.1 XML

The publisher parses string to JSON, and then JSON to XML. The XML payload is then sent to the broker which converts to sting and inserts to DB. The subscribers receives data as a string, parses string to JSON (hope this is ok as it's easier to read. The payload itself is XML) and displays. Figure 1 shows outputs of publisher, broker and both subscribers.

3.2 JSON

The publisher parses string to JSON and sends JSON payload to broker. The broker converts to string and inserts to DB. Subscribers receives string and parses to JSON before outputing to screen.. Figure 2 shows outputs of publisher, broker and both subscribers.

3.3 EXI

We tried implemeting EXI as payload but didn't quite succeed. See figure 3 and code in repository.

[1] https://medium.com/iotforall/smart-home-protocols-thread-zigbee-z-wave-knx-and-more-71efa4b410e1

[2] https://www.ti.com/lit/ds/symlink/hdc2021.pdf?ts=1619365800309&ref_url=https%253A%252F%252Fwww.google.com%252F

4 Screenshots

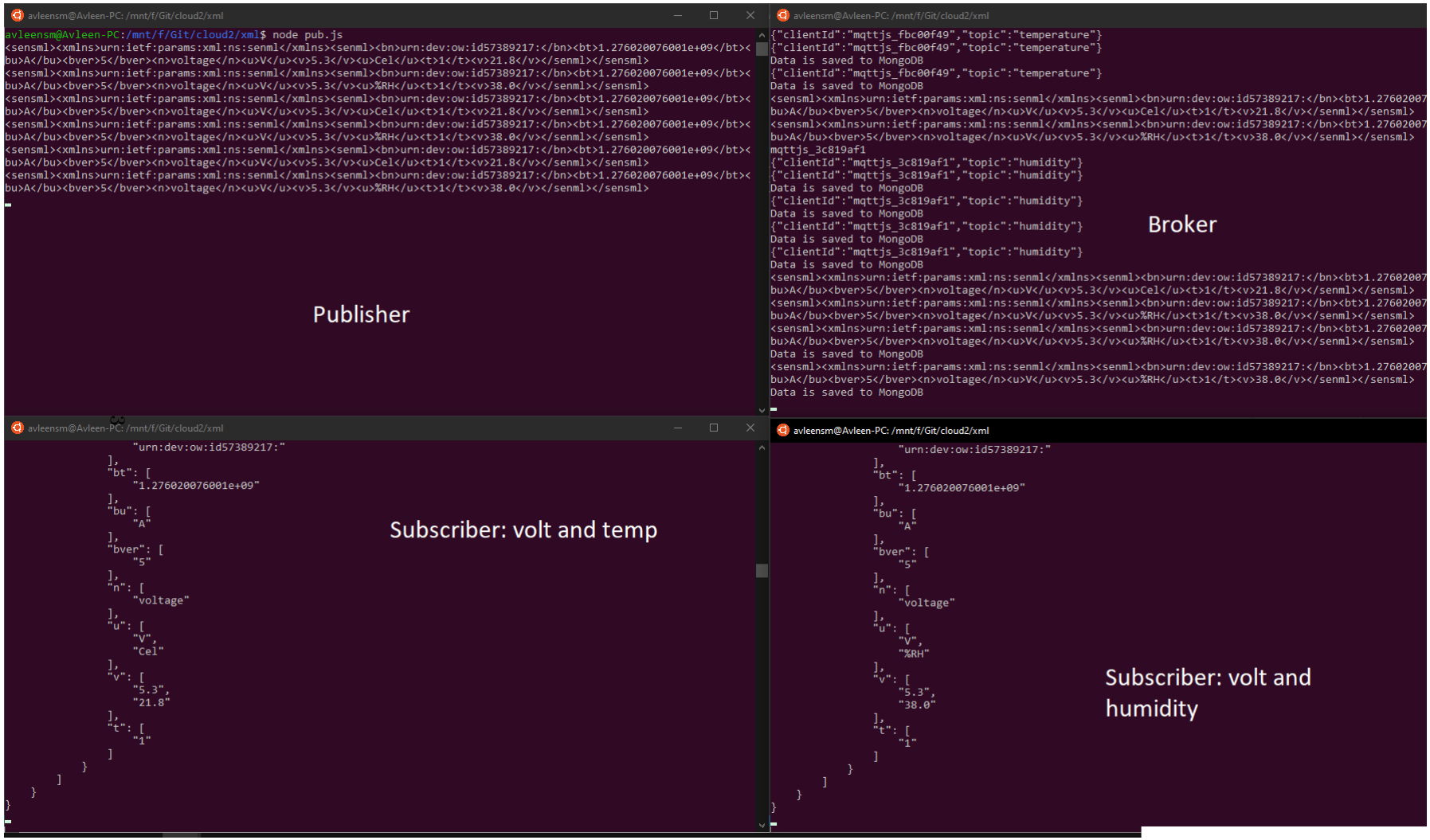

Figure 1: XML pub, sub and broker

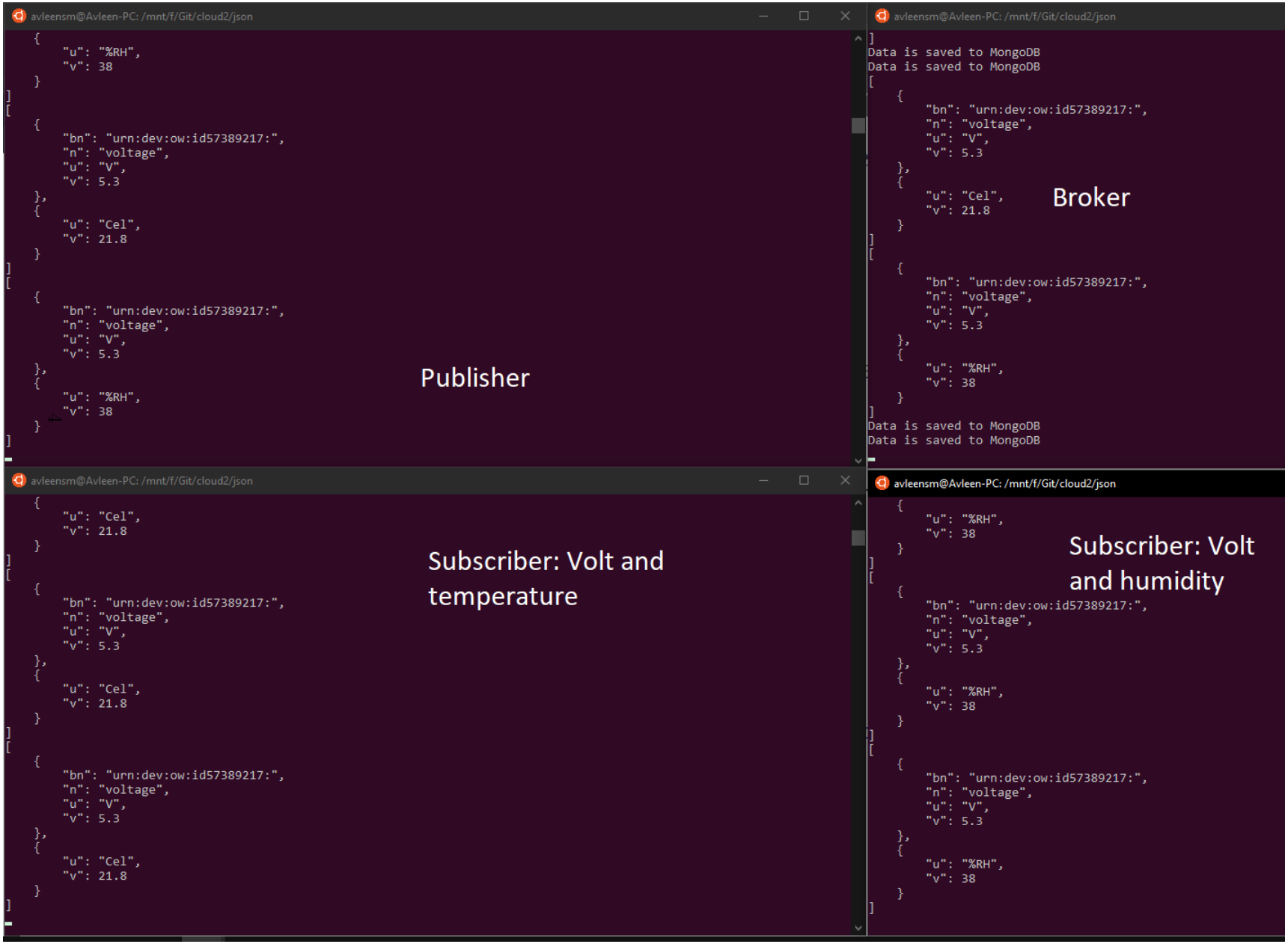

Figure 2: JSON pub, sub and broker

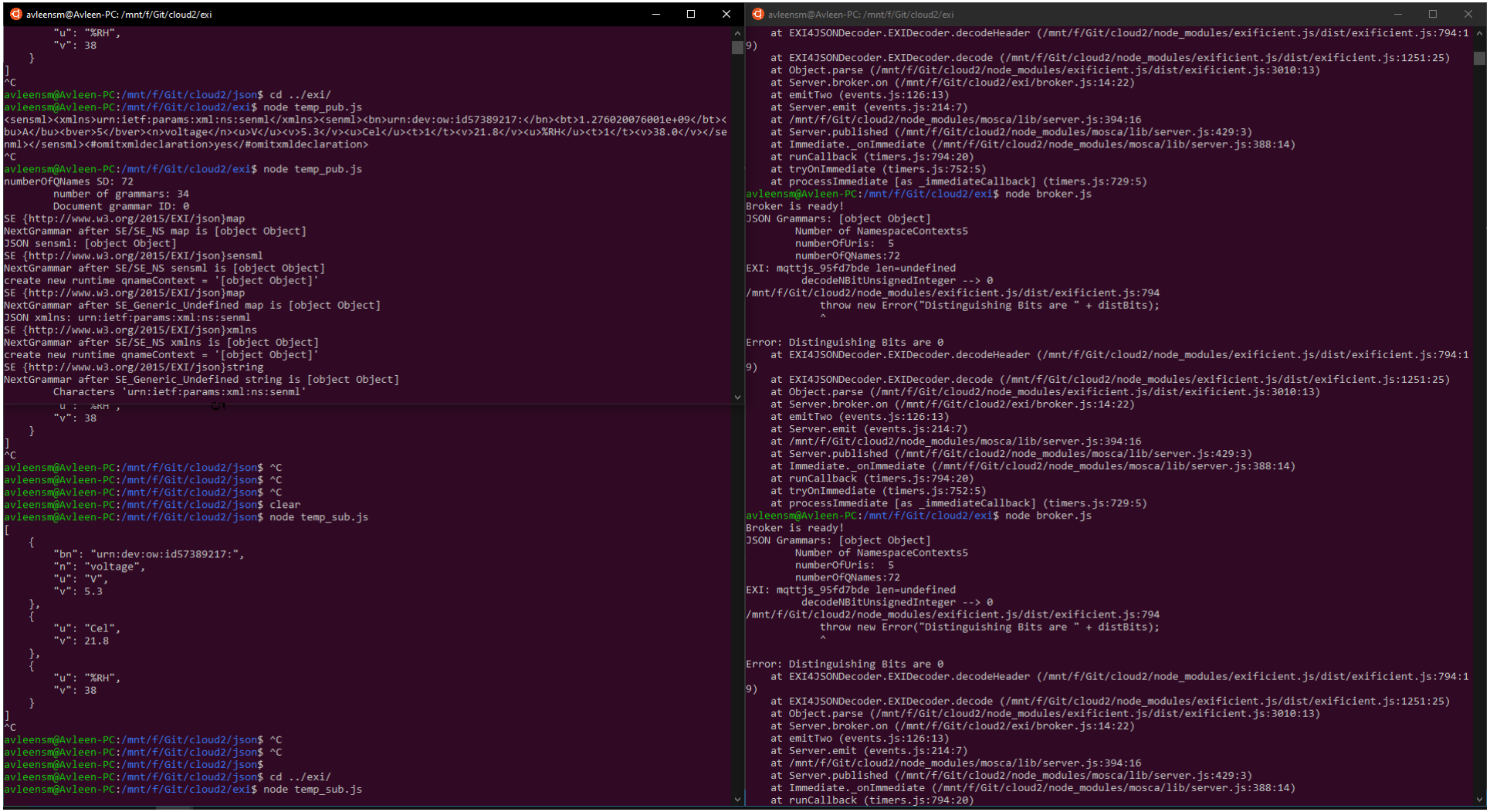

Figure 3: EXI pub, sub and broker